BIOE 519: Biomaterials Synthesis

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Spring 2017, MW 3:30 pm – 5:00 pm, BRC 282

Overview

Biomaterials Synthesis covers the design and synthesis of materials which interact with biologic phenomena such as cell-free, microbial, and mammalian systems. Topics covered include: basic organic chemistry and synthesis (as it applies to biomaterials), surfaces and surface functionalization, *in vitro* and three dimensional cell culture systems, and *in vivo* studies. The class will be rooted in a historical perspective, with a particular emphasis on the latest techniques in synthetic chemistry relating to biomaterials. We will also dive deep into landmark and newer cutting-edge primary research Literature. Learning more about scientific discourse and strategies for critique are also of principal interest in this class.

Office Hours

Contact Dr. Miller ahead of time if you would like to make use of office hours. Generally these will be the hour immediately following lectures, but we may be able to accommodate other times if you need.

Textbooks

There are no required textbooks for the class, and most reading will be handouts or available through Canvas.rice.edu. But these books may be helpful as you progress toward your final project. They should be available in the Rice Library. Also, your instructor has one copy of each available for short-term viewing (and possibly checking out):
Biomaterials Science: 3rd Edition, Ratner, Hoffman, Schoen, Lemons. ISBN: 0123746264
Bioconjugate Techniques: 3rd Edition, Hermanson. ISBN: 9780123822406

Grading

Homework: 20%
Quizzes: 10%
Exams: 20%
Journal Article Presentation: 30%
Participation: 20%

Regrade requests can be submitted to Dr. Miller within one week of receiving graded items, but keep in mind that the entire assignment/quiz/exam will be regraded in its entirety (so additional points may be taken off if initial grading is deemed too lenient).

Homeworks

Early in the semester, homeworks will focus on basic organic chemistry concepts taught in class. After that, homeworks will generally be brief summaries and scientific critiques (around 250 words each) of biomaterials-related primary research journal articles from the Literature. Several papers will be assigned per week, with the write-ups due on the date specified (typically due on Fridays).

Quizzes

Quizzes will be in-class and will help hone your skills with biomaterials and your ability to interpret work ongoing in the field.

Exams

Exams will be **cumulative** and will expect you to be able to recapitulate ideas explained in class **and** synthesize new ideas based on class content (e.g. problem solving).

Journal Article Presentation

Early in the semester, you will be assigned a date to present a **primary-research** journal article of interest to you in the field of biomaterials. The paper of interest must be submitted to Dr. Miller for approval at least 2-weeks before the presentation. If a suitable paper is not selected, you will be assigned a suitable paper to present. Relevant papers in top journals with at least 4 figures are good guidelines to aim towards. Presentations will be in front of the class and should be no more than 30-minutes including time for questions. You should adequately explain background (explaining with figures from review papers where appropriate), hypotheses, approach, materials and methods, discussion, and your own critique of the paper. Your peers in the class will assist in discussion as well as with evaluating your presentation with formalized constructive feedback. **More information will be given mid-semester.**

Special Needs

Any student with a documented special need which may impact the above should speak to Dr. Miller within the first two weeks of class; discussions will remain confidential. Students should also contact Disability Support Services in the Ley Student Center.